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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/753,499	01/09/2004	Kia Silverbrook	DAM07US	7874

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SILVERBROOK RESEARCH PTY LTD
393 DARLING STREET
BALMAIN, 2041
AUSTRALIA

EXAMINER	
ZHU, RICHARD Z	
ART UNIT	PAPER NUMBER
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/753,499	SILVERBROOK, KIA	
	Examiner	Art Unit	
	RICHARD Z. ZHU	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 March 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,11,12 and 17-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8, 11, 12, and 17-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

1. Claims 1-8, 11-12, and 17-22 are pending.

Response to Applicant's Arguments

2. Acknowledgement is made of applicant's response received on 03/04/2009. It has been entered and made of record.

3. In response to applicant's arguments, the examiner is sending a replacement office action with appropriate corrections.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 7, 11-12, and 17 are rejected under 35 USC 103 (a) as being unpatentable over ***Penn et al. (US 6169605 B1)*** in view of ***Jang et al (US 2002/0062909 A1)***.

Regarding Claim 1, ***Penn*** discloses a three dimensional object creation system for printing a three dimensional object comprised of layers stacked vertically with respect to

each other (**Fig 1 and see Col 7, Rows 16-28, layer after layer of materials 25 and 35 are stacked vertically with respect to each other**), the system comprising:

a series of printheads for printing the layers (**Col 16, Rows 35-45, Printhead 20 and Printhead 670 of integrated Printhead 650**), the series of printheads simultaneously printing at least two layers of different materials within the stack (**Fig 12, Col 16, Rows 35-45, Printhead 20 dispenses conductive object material 25 simultaneously with Printhead 670 dispenses insulative support material 35**); and

a semiconductor memory (**Col 6, Row 61-Col 7, Row 5, memory circuitries**);

Penn does not disclose the system is configured to simultaneously printing at least two layers of different vertical positions within the stack and to reconfigure a printhead initially configured to print a layer at a first vertical position to print a layer at a second vertical position.

Jang discloses a three dimensional object creation system for printing a three dimensional object comprised of layers stacked vertically with respect to each other (**Fig 1 and see Abstract**) where the system is configured to printing at least two layers of different vertical positions within the stack (**Fig 1, at least five layers of different vertical positions within the stack**) and to reconfigure a printhead (**Fig 1, material dispensing device 38 with nozzle 40, see paragraph 63**) initially configured to print a layer at a first vertical position to print a layer at a second vertical position (**Paragraphs 114-115, using dispensing devices to dispense a first pore filling material as a first layer at a first vertical location and to**

dispense a second pore filling material as a second layer onto the first layer at a second vertical location, see Fig 1).

It would've been obvious to one of ordinary skill in the art at the time of the invention to modify the 3D manufacturing system of ***Penn*** to simultaneously print two layers of different vertical positions within the stack and to reconfigure a printhead initially programmed to print at one vertical position to print at a second vertical position as taught by ***Jang*** whereas the motivation would've been to provide a 3D object manufacturing system in an office environment (***Jang*, Paragraph 18**) and that does not require heavy and expensive equipments (***Jang*, Paragraph 20**).

Regarding Claim 2, ***Penn*** discloses wherein data defining all of the layers is stored in the semiconductor memory (**Col 9, Rows 57-65**).

Regarding Claim 7, ***Penn*** discloses data links between printheads (**Col 9, Rows 57-65, in that the microprocessor dictates the configurations of printing to which each printhead must follow to execute printing. Therefore, it serves as datalink between printheads**).

Regarding Claim 11, ***Penn*** discloses wherein the printheads print two or more different materials in one layer (**Col 16, Rows 35-45, Printhead 20 dispenses conductive object material 25 while Printhead 670 dispenses insulative support material 35, See Fig 12**).

Regarding Claim 12, ***Penn*** discloses wherein the printheads are configured such that at least one of the layers may be printed with a first set of materials (**Col 16, Rows 46-56,**

where Printhead 20 filled in material 25 in one layer while Printhead 670 fill the rest of the layer in with material 35) and at least one other of the layers may be printed with a second set of materials (**Col 16, Rows 49-56, layers, that is layers other than the current layer Printhead 20 had just dispensed material 25, between the conductive lines receive material 25 from Printhead 20 thereby connecting the conductive lines of different layers**), and wherein the first and second sets are not the same (**Material 25 is conductive object material, Col 9, Rows 40-45. Material 35 in Col 16, Rows 22-23, Col 8, Rows 4-8**).

Jang further discloses each layer at different vertical positions are made of two sets of materials that are not the same (**Paragraph 115, the second pore filling material being different from the first pore filling material**).

Penn as modified by ***Jang*** would be able to print two layers of different materials at two different vertical positions.

Regarding Claim 17, ***Penn*** discloses a system including at least two printheads, a first one of printheads printing a first material and a second one of the printheads printing a second material, the first material being cured by a first method (**Col 10, Rows 24-27, Material 35 melts at a lower temperature than Material 25 therefore requiring a different curing method**) and the second material being cured by a second method and wherein the first and second methods are different (**Col 10, Rows 30-35, the first method of curing is by UV light and second method of curing is by fiber optic directed at the dispensing position whereas curing by UV light is different from curing by fiber optic**).

6. Claims 3-6 and 8 are rejected under 35 USC 103 (a) as being unpatentable over the combined teachings of ***Penn et al. (US 6169605 B1)*** and ***Jang et al (US 2002/0062909 A1)*** in view of ***Klaus et al. (US 6056455 A)***.

Regarding Claim 3, the combined teachings do not disclose printheads with individual memories.

Klaus teaches wherein each printhead includes at least some of the semiconductor memory (**Fig 4, where it is shown that each printhead includes a plurality of registers whereas these registers are obviously made by semiconductor materials**).

Therefore, it would've been obvious to one ordinarily skilled in the art to modify the printheads of the combined teachings with individual semiconductor memories as taught by ***Klaus*** in order to provide printheads with higher nozzle firing rate (***Klaus*, Col 1, Rows 12-20 and Rows 49-57**).

Regarding Claim 4, ***Penn*** teaches that the printhead is configured to print a first layer (**Col 11, Rows 8-20**).

Therefore it would've been obvious to one ordinarily skilled in the art to modify the printhead of the combined teachings with memories from ***Klaus*** to print a first layer according to configuration lay out by CAD to enable printing at an efficient rate.

Regarding Claims 5 and 6, ***Penn*** discloses that after printing of one layer is finished, the data for the next layer is loaded (**Col 11, Rows 26-38**). Therefore, by modifying the memory of ***Klaus*** into printhead of ***Penn***, the next layer of data is being loaded into the memory of the printhead as soon as the printing of first layer is successfully concluded.

Regarding Claim 8, ***Klaus*** discloses Gbytes of semiconductor memory (**Col 1, Rows 22-31 and see Col 2, Rows 57-65, to solve the problem of handling extremely high data rate with limited bandwidth in a system of between 4 to 1200 material dispensing nozzles by providing printheads with memory and decoder to decode incoming sequence of encoded data. With data rates around 120 Mb/sec (15 MB/sec) to 480 Mb/sec (60 MB/sec). The data that needed to be buffer before printing can start easily reaches the range of gigabytes**).

While ***Klaus*** does not teach that semiconductor memory must be over 10 GB, it would motivate one ordinarily skilled in the art to specify a memory capacity in the gigabyte range to handle the immense amount data for a system with number of nozzles between 4 and 1200. Furthermore, using different size to fit a particular purpose is well known in the art. For example, wearing size 10 shoes for a size 10 feet, wearing size 5 shoes for a size 5 feet. Using different size of memory to fit a particular need is well known in the art. Therefore, it would have been obvious to use any size memory so long as the job is done --including using memory about 10GB.

Therefore, it would've been obvious to one ordinarily skilled in the art to configure the memory of the printheads to have a capacity in the range of 10 GB in order to enable the plurality of printheads to execute the enormous amount of print jobs.

7. Claims 18 - 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teaching of ***Penn et al. (US 6169605 B1)*** and ***Jang et al (US 2002/0062909 A1)*** in view of ***O'Connor (U.S. 5,705,117 A)***.

Regarding Claims 18-21, the combined teachings do not teach that a non-printed object can be inserted into the product.

In a method to produce components via stereolithography, ***O'Connor*** teaches that a non-photopolymer component or item can be inserted into the prototype product being manufactured. Examples of insert members include metal or ceramic members (**Col 2, Rows 38 - 42**). As in other stereolithography systems, there is a CAD design used to create the prototype (**Col 6, Rows 24 - 25**). A microprocessor is programmed to translate the CAD data to create the appropriate STL files, from which the prototype will be manufactured, layer by layer (**Col 6, Rows 38 - 42**). The prototype is partly built and then, the system is stopped, at which time the metal or ceramic insert is placed into the cavity (**Col 6, Rows 45 - 50**). This reads on the Applicant's claims that the system include at least one printhead for printing material to create a printed product (**For example, using the printhead of Penn, Fig 12, printheads 20 and 670**), and an object incorporation device that incorporates inorganic semiconductors into the product being printed whilst the at least printhead prints the product (**O'Connor, Col 5, Rows 45-60, inserting metallic or ceramic members into cavity**); and wherein the system includes at least one object incorporation device that incorporates non-printed objects into the partially complete product, the non-printed objects not being printed by the system (**O'Connor, Col 6, Rows 38-56, microprocessor 30 programmed to perform the insertion**); wherein an object incorporation device that inserts at least one non-printed object into at least one cavity created during the printing process, the object incorporation device incorporating the at least one non-printed object into the at least one cavity during the printing of the respective printed object (**O'Connor, Col 6, Rows 44-56,**

when a first part is build, supposedly using the printhead of Penn, the printhead is stopped so that the metallic or ceramic insert within appropriate cavity is performed); and wherein the system includes at least one printhead that prints electrical connections to at least one object incorporated in the products (**Fig 2, metals and ceramics are well known electric conducting materials**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the Applicant's invention to modify the system of the combined teachings to incorporate the object incorporation device of ***O'Connor*** by modifying microprocessor 30 to control the overall operations of printhead 25 and 670 for the purpose of inserting a ceramic or metal component into a designated cavity of the prototype, if necessary, depending on what type of prototype is being manufactured.

8. Claim 22 are rejected under 35 USC 103 (a) as being unpatentable over the combined teachings of ***Penn et al. (US 6169605 B1)*** and ***Jang et al (US 2002/0062909 A1)*** in view of ***Miyake et al (US 6174039 B1)***.

Regarding Claim 22, the combined teachings do not teach wherein upon failure of printhead whilst printing its respective layer, each subsequent printhead is dynamically reconfigured to complete the printing of at least part of the layer preceding its respective layer.

Miyake teaches a print data creation system comprising a plurality of printheads (**Col 4, Rows 58-67, seven recording heads in total**) that prints objects layer by layer (**Col 7, Rows 46-55, dividing image data to be printed in two scans or two layers, the first layer being the first 50% of the original image data density from 0% to 50% and the second**

layer being the second 50% of the original image data density; whereas when two layers are superimposed, 100% of the original image data density is reproduced), at least some of the layers being different materials (**Col 4, Rows 58-67, cyan, cyan-special, magenta, magenta-special, orange, yellow, and black**), and the system is configured to enable each printhead initially configured to print at least part of a respective layer of a respective material to be dynamically reconfigured to print at least part of another layer of another material (**Abstract and see Col 7, Row 32 – Col 8, Row 40, image data to be supplied to abnormal recording element is moved to image data of other recording elements to complement the recording**), and if at least one printhead fails whilst printing its respective layer, each subsequent printhead is dynamically reconfigured to complete the printing of at least part of the layer preceding its respective layer (**Col 7, Row 59 – Col 8, Row 4, when a nozzle was detected to be abnormal, the part of the data of a first layer it was originally responsible for is transfer to the corresponding part of the data of a subsequent layer to be printed by a normal nozzle, see Col 8, Rows 1-5, "As the nozzle for printing superposed data is normal"**).

Miyake demonstrated that it is well known in the art of object data creation of printing layer by layer to dynamically reconfigure a first nozzle that prints a subsequent layer of material to complete the printing of at least part of the layer preceding it, said part originally being the responsibility of a currently abnormal nozzle.

Therefore, it would've been obvious to one of ordinary skill in the art at the time of the invention was made to apply the known technique and architecture of ***Miyake*** of printing image data layer by layer into the 3D object creation system of the combined teachings to

print 3 dimensional materials layer by layer so that the printhead of the combined teachings can dynamically reconfigure a first nozzle to print a layer of material that was previously the responsibility of a second nozzle that is currently in an abnormal state whereas the motivation would've been to ensure data which may be printed abnormally or missed if no measure is taken can be correctly printed in accordance with the data (***Miyake*, Col 8, Rows 1-5**).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Richard Z. Zhu whose telephone number is 571-270-1587 or examiner's supervisor King Y. Poon whose telephone number is 571-272-7440. Examiner Richard Zhu can normally be reached on Monday through Thursday, 6:30 - 5:00.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RZ^2
05/01/2009

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